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Longitudinal match performance characteristics of UK and non-UK players in the English Premier League

Michael Bush[a], David T Archer[a], Chris Barnes[b], Bob Hogg[a] and Paul S Bradley[c]

[a]Department of Sport and Exercise Sciences, University of Sunderland, Sunderland, UK; [b]Medical Department, West Bromwich Albion Football Club, Birmingham, UK; [c]Carnegie School of Sport, Leeds Beckett University, UK

ABSTRACT

This study investigated the longitudinal match performance characteristics in the English Premier League (EPL), with special reference to player nationality (UK vs. non-UK). Match observations (n = 14700) were collected using a multi-camera computerised tracking system across 7 consecutive EPL seasons (2006–2007 to 2012–2013). Player nationality referred to their birthplace, with players born in England, Scotland, Wales or Northern Ireland classified as the UK players and other nationalities considered non-UK. The non-UK players demonstrated the most pronounced increases in high-intensity running distance across the 7 seasons compared with UK players ($P < 0.001$, ES: 0.91 vs. 0.73). The UK players covered more high-intensity running distance in 2006–2007 ($P < 0.001$, ES: 0.24 [CI 0.17–0.31]), however by 2012–2013 both populations covered similar distances ($P > 0.05$, ES: 0.08 [CI 0.01–0.15]). In contrast, the non-UK players performed more passes in 2006–2007 compared with the UK players ($P < 0.001$, ES: 0.23 [CI 0.16–0.3]), however by 2012–2013, passing performance between the UK and non-UK players was equal ($P > 0.05$, ES: 0.05 [CI −0.01–0.13]). The data demonstrates that the longitudinal match performance characteristics in the EPL are similar between the UK and non-UK populations.

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KEYWORDS
Evolution; football; foreign players; sprinting; passing

Introduction

Soccer is a complex sport with players randomly transitioning between maximal, or near-maximal, multidirectional high-intensity efforts and longer periods of low-intensity activity (Bangsbo, Mohr, & Krustrup, 2006). Players typically cover 9–14 km in total during a match with high-intensity running accounting for ~10% of that distance (Di Mascio & Bradley, 2013; Mohr, Krustrup, & Bangsbo, 2003). The physical demands of match play have been quantified in the English Premier League (EPL) (Bradley et al., 2009; Di Salvo, Gregson, Atkinson, Tordoff, & Drust, 2009), Italian Serie A (Mohr et al., 2003; Vigne, Gaudino, Rogowski, Alloatti, & Hautier, 2010), Spanish La Liga (Castellano, Blanco-Villaseñor, & Alvarez, 2011), French Ligue 1 (Carling, 2010), German Bundesliga (Hoppe, Slomka, Baumgart, Weber, & Freiwald, 2015) in addition to the UEFA European Champions League (Bradley, Dellal, Mohr, Castellano, & Wilkie, 2014; Di Salvo et al., 2010). The research results suggest that the EPL is one of the most physically intense Leagues in Europe (Bradley et al., 2009; Dellal et al., 2011; Di Salvo et al., 2009). Despite the physicality of modern match play, players are still expected to be proficient in an array of technical skills, more particularly passing performance, and have exceptional tactical awareness in order to be successful, which is more closely related with game outcome (Barnes, Archer, Hogg, Bush, & Bradley, 2014; Bradley et al., 2013; Carmichael, Thomas, & Ward, 2001; Dellal et al., 2011; Lago & Martín, 2007; Rampinini, Impellizzeri, Castagna, Coutts, & Wisløff, 2009). More limited information is available on the technical variables in different leagues. Nevertheless the information available suggests passing performance is lower in the EPL compared with the main European Leagues. Players in the EPL perform both fewer passes in total and fewer successful passes compared to players in the Italian Serie A (Rampinini et al., 2009). In addition, more long passes are observed in the EPL compared with the Italian and Spanish Leagues (Barnes et al., 2014; Dellal et al., 2011; Rampinini et al., 2009). It may be speculated, but unproven, that the greater technical performance observed by players in other leagues would be transferred when players transfer between leagues. Although technical match parameters are strongly influenced by playing styles, formations and location on the pitch (Bradley et al., 2011) which must be factored into the interpretation of data.

The EPL has undergone substantial change over the last decade with the distances covered at high intensity and sprinting increasing by 30–50% and the number of passes rising by 40% (Barnes et al., 2014), with subsequent research identifying these evolutionary trends to be position and tier specific (Bush, Barnes, Archer, Hogg, & Bradley, 2015; Bradley et al., 2015). Despite a lack of supporting evidence, a commonly held belief within the game is that the increased migration of the non-UK players into the EPL could account for these recent alterations in technical performances (Richardson, Littlewood, Nesti, & Benstead, 2012), although its unclear why such pronounced increases have been observed in physical performances. The increased proportion of the non-UK players in the EPL is related to the Bosman ruling which abolished foreign player quotas for clubs, allowing teams to buy the non-UK players without restriction (Binder & Findlay, 2012;

CONTACT Paul S Bradley Paulbradley94@yahoo.co.uk Research Institute of Sport & Exercise Sciences, Liverpool John Moores, Liverpool, UK
Present address for Paul S Bradley is Research Institute of Sport & Exercise Sciences, Liverpool John Moores, Liverpool, UK.

Littlewood, Mullen, & Richardson, 2011; Richardson et al., 2012). Nevertheless, previous studies have not accounted for the influence of the non-UK players on longitudinal match performance and thus the present study investigated the longitudinal impact of the UK and non-UK players on match performance characteristics in the EPL.

Methods

Match analysis and player data

Match performance data were collected from 7 consecutive EPL seasons (2006–2007 to 2012–2013) using a computerised multiple-camera tracking system (Prozone Sports Ltd.®, Leeds, UK). Players' movements were captured during matches by cameras positioned at roof level and analysed using proprietary software to produce a data set on each player's physical and technical performance. The validity and reliability of this tracking system has been quantified to verify the capture process and data accuracy (Di Salvo, Collins, McNeill, & Cardinale, 2006; Di Salvo et al., 2009). Ethical approval was obtained from the appropriate institutional ethics committee with Prozone Sports Ltd.® supplying the data and granting permission to publish.

Data were derived from Prozone's Trend Software and consisted of 1036 individual players across 22,846 player observations. Original data files were desensitised but included 33 different teams overall with 20 teams evaluated in each season. Individual match data were only included for outfield players that had completed the entire 90 min (Carling & Dupont, 2011). Matches were excluded if a player dismissal occurred. The total number of observations was substantially different across season (2006–2007 to 2012–2013 [range = 2604–4794]), phase of season (August–November, December–February, March–May [range = 6828–8214]), position (attackers, central defenders, central midfielders, full backs, wide midfielders [range = 3405–5755]), location (Home and Away [range-11399–11447]) and team standard based on final league ranking. The original data was subjected to a number of resampling processes in order to balance the number of observations in each of these categories thus minimising errors when applying statistical tests. Table 1 shows a detailed breakdown of the resampled data. The resampling was achieved using the stratified function in the R package "devtools" (R Development Core Team) using the procedures of Wickham and Chang (2013) with 14,700 player observations included for further analysis.

Classification of player nationality

Classifying a players' nationality is a complex process, thus a systematic approach was taken to enable the longitudinal match performance trends of players with different nationalities to be explored. The national team a player was eligible to play for dictated the nationality selected for that individual. Players with an English, Scottish, Welsh or Northern Irish nationality were considered the UK players, with all other nationalities considered non-UK, including players of Republic of Ireland nationalities due to historical political and social issues (McGovern, 2002). Table 2 shows a detailed breakdown of the UK and non-UK observations.

Match performance parameters

Activities were coded into the following: standing (0–0.6 km · h^{-1}), walking (0.7–7.1 km · h^{-1}), jogging (7.2–14.3 km · h^{-1}), running (14.4–19.7 km · h^{-1}), high-speed running (19.8–25.1 km · h^{-1}) and sprinting (>25.1 km · h^{-1}) (Bradley et al., 2009). High-intensity running consisted of the combined distance in high-speed running and sprinting (≥19.8 km · h^{-1}) and was separated into 3 subsets based on the teams' possession status: with or without ball possession and when the ball was out of play (WP, WOP and BOP, respectively). An explosive sprint is where a player enters a sprint immediately after a low-to-moderate speed activity (<19.8 km · h^{-1}) in the previous 0.5 s period, without entering a high-speed run. A leading sprint is where a player enters a sprint from a high-speed run in the previous 0.5 s period (Di Salvo et al., 2010). Match analysis included the coding of technical parameters according to playing position based on the criteria defined by Prozone and included the number of passes, received passes and successful passes (Barnes et al., 2014). Pass distance referred to the

Table 1. Detailed breakdown of the sample data following the re-sampling process.

Season	2006–2007	2007–2008	2008–2009	2009–2010	2010–2011	2011–2012	2012–2013	Total
Month								
August–November	700 (33)	700 (33)	700 (33)	700 (33)	700 (33)	700 (33)	700 (33)	**4900 (33)**
December–February	700 (33)	700 (33)	700 (33)	700 (33)	700 (33)	700 (33)	700 (33)	**4900 (33)**
March–May	700 (33)	700 (33)	700 (33)	700 (33)	700 (33)	700 (33)	700 (33)	**4900 (33)**
Location								
Home	1083 (52)	1078 (51)	1050 (50)	1069 (51)	1051 (50)	1049 (50)	1019 (49)	**7399 (50)**
Away	1017 (48)	1022 (49)	1050 (50)	1031 (49)	1049 (50)	1051 (50)	1081 (51)	**7301 (50)**
Position								
AT	315 (15)	310 (15)	309 (15)	308 (15)	306 (15)	306 (15)	298 (14)	**2152 (15)**
CB	534 (25)	527 (25)	523 (25)	539 (26)	554 (26)	546 (26)	569 (27)	**3792 (26)**
CM	459 (22)	463 (22)	465 (22)	464 (22)	454 (22)	452 (22)	443 (21)	**3200 (22)**
FB	475 (23)	489 (23)	493 (23)	487 (23)	491 (23)	487 (23)	498 (24)	**3420 (23)**
WM	317 (15)	311 (15)	310 (15)	302 (14)	295 (14)	309 (15)	292 (14)	**2136 (15)**
Standard								
A (1st–4th)	319 (15)	245 (12)	339 (16)	360 (17)	424 (20)	446 (21)	386 (18)	**2519 (17)**
B (5th–8th)	509 (24)	436 (21)	407 (19)	385 (18)	459 (22)	347 (17)	422 (20)	**2965 (20)**
C (9th–14th)	486 (23)	719 (34)	656 (31)	713 (34)	587 (28)	636 (30)	651 (31)	**4448 (30)**
D (15th–20th)	786 (37)	700 (33)	698 (33)	642 (31)	630 (30)	671 (32)	641 (31)	**4768 (32)**
Nationality								
UK	968 (46)	979 (47)	972 (46)	1006 (48)	975 (46)	1049 (50)	931 (44)	**6880 (47)**
Non-UK	1132 (54)	1121 (53)	1128 (54)	1094 (52)	1125 (54)	1051 (50)	1169 (56)	**7820 (53)**
Overall	**2100**	**2100**	**2100**	**2100**	**2100**	**2100**	**2100**	**14700**

Table 2. The number of the UK and non-UK observations per season following resampling. The observations are broken down into the 5 main outfield playing positions; Centre Backs (CB), Full Backs (FB), Centre Midfielders (CM), Wide Midfielders (WM) and Attackers (AT).

Season		2006–2007	2007–2008	2008–2009	2009–2010	2010–2011	2011–2012	2012–2013	Total
CB	UK	218	222	233	307	274	301	237	1792
	Non-UK	316	305	290	232	280	245	332	2000
CM	**UK**	211	241	250	231	241	253	195	1622
	Non-UK	248	222	215	233	213	199	248	1578
FB	**UK**	244	239	236	208	233	239	250	1649
	Non-UK	231	250	257	279	258	248	248	1771
WM	**UK**	166	146	135	121	126	155	141	990
	Non-UK	151	165	175	181	169	154	151	1146
AT	**UK**	129	131	118	139	101	101	108	827
	Non-UK	186	179	191	169	205	205	190	1325
Overall		2100	2100	2100	2100	2100	2100	2100	14700

overall length of the pass and was split into short (≤10 m), medium (11–24 m) and long (≥25 m). Technical performance was limited to passing variables due to the high variability of other technical parameters (Bush, Archer, Hogg, & Bradley, 2015), making meaningful differences between categories more difficult to identify.

Statistical analysis

Factorial analysis of variance (ANOVA) tests with sphericity assumed were used to compare the UK and non-UK populations from each season. Dunnet's *post hoc* tests used to verify localised differences relative to 2006–2007 for each subsequent season with significance set at $P < 0.05$. Normality was assessed visually, since even minor deviations from normality can result in data being classified as not normally distributed with such a large data set. The effect size (ES) was calculated to determine the meaningfulness of the difference, corrected for bias using Hedges formula and presented with 90% confidence intervals (CI). Calculations of absolute change per season for selected indicators were assessed based on the 90% CI of the coefficient of the slope (linear regression). The ES magnitudes were classified as trivial (<0.2), small (>0.2–0.6), moderate (>0.6–1.2) and large (>1.2; Batterham & Hopkins, 2006). All analyses were conducted using statistical software (R Development Core Team) and data visualisation was carried out using the ggplot2 package accessed via the Deducer Interface for the R statistical programming language.

Results

Physical parameters

The UK players covered greater distances at high-intensities compared with the non-UK players $\boldsymbol{F}$ (1,6) = 19.433, $P < 0.001$. Further analysis identified these results to be different in 2006–2007 (929 ± 310 vs. 858 ± 286 m, $P < 0.01$, ES: 0.24 [CI 0.17–0.31]). However, the non-UK players recorded greater increases over the 7 seasons ($P < 0.001$, ES: 0.91 [CI 0.83–0.97] vs. 0.73 [CI 0.65–0.80]), resulting in comparable high-intensity running distance being covered by 2012–2013 (UK: 1167 ± 344 vs. non-UK: 1139 ± 331 m, ES: 0.08 [CI 0.01–0.15]). These increases were equivalent to 31 (CI 27–34) and 40 (CI 37–43) m · match^{-1} · season^{-1} for the UK and non-UK players, respectively (Figure 1(a)). In contrast, only trivial differences were observed in high-intensity running distance WP, $\boldsymbol{F}$ (1,6) = 4.057, $P < 0.05$. Subsequent analysis identified these trivial differences to be present in both 2006–2007 (UK: 391 ± 240 vs. non-UK: 358 ± 235 m, $P < 0.05$, ES: 0.14 [CI 0.07–0.21]), and 2012–2013 (UK: 478 ± 260 vs. non-UK: 478 ± 261 m, ES: 0.0 [CI −0.07–0.07]). Though the increase was equivalent to 9 (CI 7–12) and 19 (CI 17–21) m · match^{-1} · season^{-1} for the UK and non-UK players, respectively. Differences were observed between the UK and non-UK players for high-intensity running distance WOP, $\boldsymbol{F}$ (1,6) = 76.112, $P < 0.001$. These trivial differences were detected in 2006–2007 (UK: 468 ± 164 vs. non-UK: 437 ± 159 m, $P < 0.001$. ES: 0.19 [CI 0.12–0.26]) and 2012–2013, although non-significant in the latter, (UK: 599 ± 192 vs. non-UK: 581 ± 202 m, $P > 0.05$, ES: 0.09 [CI 0.02–0.16]), being equivalent to 18 (CI 17–20) and 19 (CI 17–20) m · match^{-1} · season^{-1} for the UK and non-UK players, respectively.

The UK players covered significantly different sprint distances compared with the non-UK players $\boldsymbol{F}$ (1,6) = 6.807, $P < 0.01$. Further analysis highlighted these trivial differences in 2006–2007 (243 ± 117 vs. 222 ± 110 m, $P < 0.001$, ES: 0.19 [CI 0.11–0.26]), and 2012–2013 (UK: 355 ± 147 vs. non-UK: 346 ± 133 m, ES: 0.06 [CI −0.01–0.14]). Sprint distance increased by 15 (CI 14–17) and 18 (CI 17–19) m · match^{-1} · season^{-1} for the UK and non-UK players, respectively (Figure 1(b)). No differences were observed between the UK and non-UK players, respectively, for both the number of sprints performed (2006–2007: 32 ± 15 vs. 30 ± 14; 2012–2013: 57 ± 21 vs. 56 ± 20, $P > 0.05$, ES: <0.15 [CI −0.02–0.21]) and the average distance per sprint (2006–2007: 6.9 ± 1.3 vs. 6.9 ± 1.4 m; 2012–2013: 5.9 ± 0.9 vs. 5.9 ± 0.8 m, $P > 0.05$, ES: 0.0 [CI −0.07–0.07]), with similar changes across the seasons. The number of sprints performed increased by 3.5 (CI 3.4–3.7) and 4.0 (CI 3.8–4.1) match^{-1} · season^{-1} in the UK and non-UK players, respectively, whereas the average distance covered per sprint decreased annually by 0.2 (CI 0.1–0.2) m · match^{-1} · season^{-1} in both groups. In addition, the number of leading (2006–2007: 21 ± 10 vs. 20 ± 9, $P > 0.05$, ES: 0.11 [CI 0.03–0.18]; 2012–2013: 31 ± 13 vs. 30 ± 12, $P > 0.05$, ES: 0.08 [CI 0.01–0.15]) and explosive sprints (2006–2007: 11 ± 7 vs. 10 ± 6, $P > 0.05$, ES: 0.15 [CI 0.08–0.23]; 2012–2013: 27 ± 11 vs. 26 ± 10, $P > 0.05$, ES: 0.1 [CI 0.02–0.17]) did not differ between the UK and non-UK in both seasons, these having increased annually per match by a similar magnitude for leading (1.2 [CI 1.1–1.4] and 1.5 [CI 1.4–1.6]) and explosive sprints (2.3 [CI 2.2–2.4] and 2.5 [CI 2.4–2.5]), respectively.

Technical parameters

Technical data revealed trivial to small differences between the UK and non-UK players. The number of passes performed highlighted differences between the UK and non-UK players $\boldsymbol{F}$ (1,6) = 52.784, $P < 0.001$. Subsequent analysis identified the non-UK players performed 3 more passes per match in 2006–2007 (27 ± 14) compared with the UK players (24 ± 12, ES: 0.23 [CI 0.16–0.3]), however, by 2012–2013, this difference was trivial (non-UK 36 ± 17 vs. UK: 35 ± 17, $P > 0.05$, ES: 0.05 [CI −0.01–0.13]). This was equivalent to an increase of 1.8 (CI 1.6–1.9) and 1.7 (CI 1.6–1.9) passes · season^{-1} made by the UK and non-UK players, respectively (Table 3). When broken down, the number of short passes increased from 6 ± 4 in 2006–2007 to 9 ± 5 (ES: 0.61 [CI 0.53–0.68]) for the UK players and from 7 ± 5 to 10 ± 6 (ES: 0.54 [CI 0.47–0.61]) for the non-UK players, annual changes of 0.5 (CI 0.5–0.6) passes · match^{-1} · season^{-1}. Over the same time period, there was

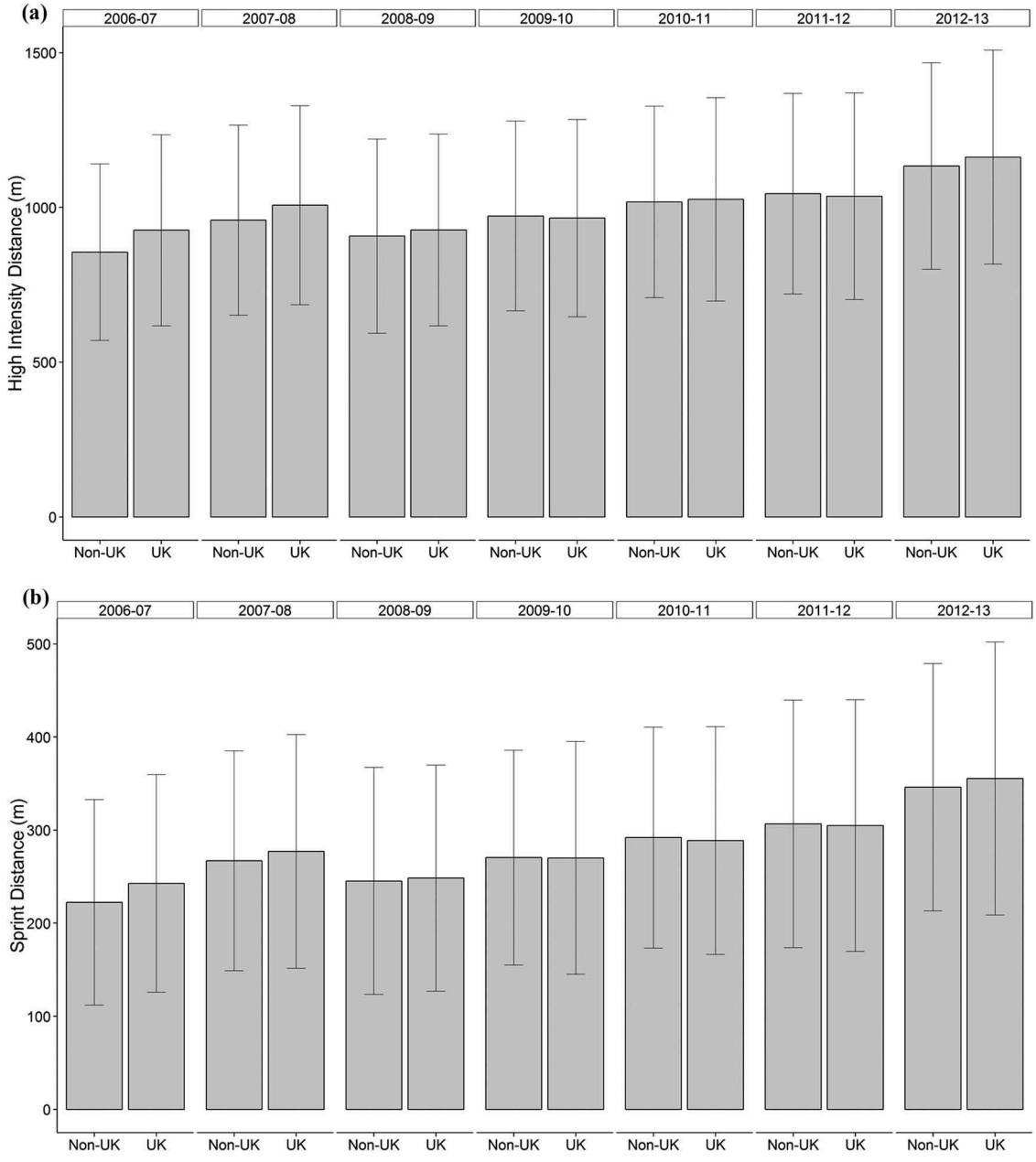

Figure 1. (a) High-intensity running and (b) sprinting distances covered by the UK and non-UK players across the 7 seasons of the EPL. Data represents means and standard deviations.

Table 3. Changes in the number of passes and passing distance between the UK and non-UK players.

	Short pass		Medium pass		Long pass		Total pass		Pass completion (%)	
	UK	Non-UK	UK	Non-UK	UK	Non-UK	UK	Non-UK	UK	Non-UK
2006–2007	5.7 ± 3.9	6.6 ± 4.5	12.3 ± 7.9	14.3 ± 9.3	5.9 ± 4.0	5.6 ± 4.0	23.8 ± 12.4	26.5 ± 14.2	75.3 ± 13.4	77.2 ± 12.1
2007–2008	6.7 ± 4.4	7.3 ± 5.0	13.8 ± 8.3	14.7 ± 9.2	6.1 ± 4.1	5.4 ± 3.8	26.6 ± 13.1	27.4 ± 14.2	77.0 ± 12.3	78.9 ± 11.9
2008–2009	7.2 ± 4.8	8.5 ± 5.7	15.9 ± 9.7	17.5 ± 10.8	6.6 ± 4.5	5.9 ± 4.5	29.7 ± 15.0	31.8 ± 16.8	79.8 ± 11.4	81.4 ± 10.5
2009–2010	7.0 ± 4.8	8.1 ± 5.4	14.7 ± 9.3	16.3 ± 9.4	6.2 ± 4.5	5.7 ± 4.0	27.9 ± 14.7	30.0 ± 14.4	77.1 ± 12.5	79.2 ± 11.2
2010–2011	7.6 ± 4.8	8.8 ± 5.4	17.3 ± 10.2	18.0 ± 9.9	6.8 ± 4.4	5.7 ± 4.0	31.7 ± 15.7	32.5 ± 14.6	80.4 ± 11.0	81.8 ± 9.9
2011–2012	8.8 ± 5.9	10.3 ± 6.8	18.8 ± 12.0	20.6 ± 11.6	6.3 ± 4.5	6.2 ± 4.7	33.9 ± 18.2	37.1 ± 18.1	83.6 ± 9.9	84.5 ± 9.3
2012–2013	9.1 ± 5.7	9.6 ± 6.2	19.3 ± 11.1	20.2 ± 11.5	6.2 ± 4.6	6.2 ± 4.4	34.7 ± 16.8	36.9 ± 17.3	83.0 ± 10.0	83.5 ± 10.2

an increase in the number of medium passes made ***F*** (1,6) = 65.302, $P < 0.001$. Further tests revealed this to be for both the UK (12 ± 8 to 19 ± 11, ES: 0.73 [CI 0.65–0.80]) and non-UK players (14 ± 9 to 20 ± 12, ES: 0.56 [CI 0.49–0.63]), increasing annually to a similar degree (1.1 [CI 1.0–1.2] passes · match^{-1} · season^{-1}). Pass success rate recorded different results across the seasons between the UK and non-UK players ***F*** (1,6) = 63.308, $P < 0.001$. Non-UK players recorded a trivially different pass success rate in 2006–2007 (UK: 75 ± 13 vs. non-UK: 77 ± 12%, ES: 0.16 [CI 0.09–0.23 and 2012–2013 (UK: 83 ± 10 vs.

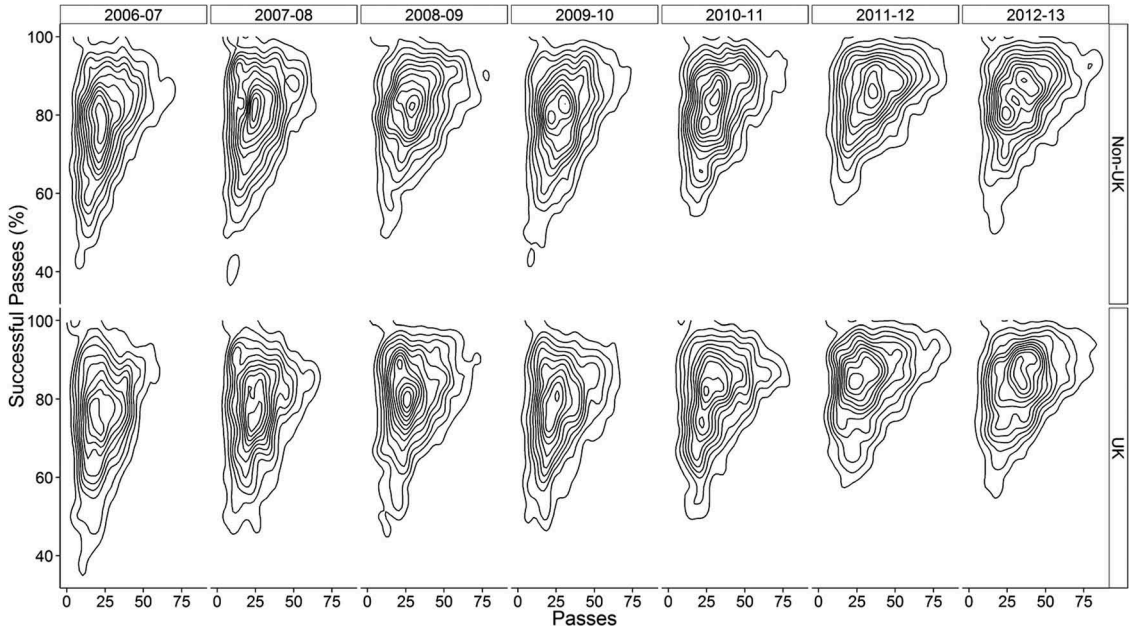

Figure 2. Two-dimensional kernel density plots representing the number of passes and the pass success rate of the UK and non-UK players across 7 seasons. The plot displays an increasing number of passes for both the UK and non-UK (plot width), while the UK players show a greater change in pass completion rate over the 7 seasons (plot length).

non-UK: 84 ± 10%, ES: 0.10 [CI 0.03–0.17]). Pass success rate increased by 1.3 (CI 1.2–1.4) and 1.1% (CI 1.0–1.2) match^{-1} · season^{-1} for the UK and non-UK players, respectively (Figure 2). The percentage of occurrences of the UK players with a passing success rate of <70% decreased from 29% in 2006–2007 to 9% in 2012–2013, whereas it decreased from 24% to 10% for the non-UK players over the same time period. The number of passes received differed between the UK and non-UK players $\boldsymbol{F}$ (1,6) = 60.639, $P < 0.001$. These differences were identified to be of trivial magnitudes for the non-UK compared with the UK players in both 2006–2007 (20 ± 13 vs. 18 ± 11, ES: 0.17 [CI 0.09–0.24]) and 2012–2013 (UK: 29 ± 15 vs. non-UK: 30 ± 15, ES: 0.07 [CI −0.01–0.14]), increasing by 1.8 (CI 1.7–1.9) passes · match^{-1} · season^{-1}.

Discussion

The aim of this study was to investigate the longitudinal match performance characteristics of the UK and non-UK players in the EPL. Research to date on the involvement of the UK and non-UK players in the EPL has focussed on migration patterns (Maguire & Pearton, 2000; Richardson et al., 2012), the legal aspects of player movement (Gardiner & Welch, 2011) and the impact of migration on national teams (Binder & Findlay, 2012; Maguire & Pearton, 2000). To our knowledge, although some research has analysed the differences between different leagues (Dellal et al., 2011; James, Mellalieu, & Hollely, 2002), no research has examined the longitudinal effect of player nationality on match performance.

The results from the present study suggest that the UK players performed more physical workloads during matches compared with the non-UK players in 2006–2007, while the opposite was observed for technical variables, with the non-UK players performing more passes compared with the UK players. Interestingly, the non-UK players recorded a marginally higher number of passes received than the UK players which could suggest, they were more confident ball-playing footballers compared with the UK players. Nevertheless, by the 2012–2013 seasons, there was little difference between the UK and non-UK players' physical and technical performances. The non-UK players demonstrated greater relative increases for physical parameters in this study compared with the UK players (sprint distance: 55% vs. 47%; high-intensity distance: 33% vs. 27%; high-intensity distance WOP: 35% vs. 27%; leading sprints: 52% vs. 46%). Nevertheless, it is important to point out that the ES for these UK and non-UK comparisons were of trivial to small magnitudes and thus these differences may not be practically meaningful. Although unlikely to have a major impact on findings, it is worthy of note that the resampling process had minor effect on the number of observations for the UK and non-UK players and the proportions of players in the EPL differs marginally from the resampled data (Table 2). It is possible that the UK players were more accustomed to working at higher intensities compared with the non-UK players. Players' intermittent exercise test performances have been shown to correlate with physical match performance (Bradley, Bendiksen et al., 2014; Krustrup et al., 2003). There are limited physical capacity differences in Middle Eastern, Asian and African players in comparison with the UK players (Chaouachi et al., 2010; Kulkarni, Levin, Peñailillo, Singh, & Singh, 2013; Ueda et al., 2011). Although players are performing lower physical workloads during matches in different national leagues (Barros et al., 2007), this is probably due to the requirements of the respective leagues rather than the players' individual capacities. In support of this, researchers have observed changes in physical performance when performing at different playing levels without changes in the physiological profile of players (Andersson, Randers, Heiner-Møller, Krustrup, & Mohr, 2010; Bradley et al., 2013). This suggests that player work rates are dictated by the situational

and tactical factors, independent of their physical capacities. Alternatively, and more probable, are improvements in the recruitment process permitting clubs to employ the non-UK players with greater capacity to work at higher intensities.

There is limited research assessing the technical performance from different world leagues, though it would suggest limited differences exist within European countries (James et al., 2002; Janković, Leontijević, Jelušić, & Pašić, 2011; Tenga, Ronglan, & Bahr, 2010). In the present study, the UK players demonstrated greater percentage increases for passing variables compared with the non-UK players (passes: 48% vs. 34%; passes received: 63% vs. 50%; short passes: 67% vs. 47%; medium passes: 56% vs. 38%). In support of this, the percentage of player occurrences with a passing success rate of <70%, identified as a minimum requirement in elite soccer (Dellal et al., 2011), was lower in the UK players compared with the non-UK players in 2006–2007 (29% vs. 24%), whereas by 2012–2013, no differences were present (UK: 9% vs. non-UK: 10%). Overall, these data could suggest that the non-UK players were initially accustomed to more technically based playing styles before employment in the UK and may therefore have contributed to the development of possession-based playing strategies in the EPL. Alternatively, these changes in technical performance in both the UK and non-UK players could be due to the influx of foreign managers employing this style of play within their coaching philosophy and recruiting players that can integrate into the playing style (Barnes et al., 2014; Bush, Barnes et al., 2015).

The physical demands (both the total distance and distances at high intensity and sprinting) in the EPL across the 7 seasons analysed in this study are consistently higher than those measured in other leagues in both Europe and worldwide (Barros et al., 2007; Dellal et al., 2011). As a result, the non-UK players transitioning into the EPL may be required to perform greater physical workloads during matches, while replicating the technical ability they were recruited for. The present study accounted for player nationality, and while the results displayed fewer obvious trends, a convergence over time was evident for both physical and technical performance between the UK and non-UK players. It is possible that the UK players have encouraged the evolution in the non-UK players' physical performance, while the non-UK players' technical performance has aided the UK players' technical performance. Due to the number of the non-UK players in the EPL, as well as the growing arguments associated with the reducing numbers of the UK players and the wider effects on the UK national teams, the FA has proposed to increase the minimum number of "home-grown" (affiliated to a the UK-based football association for 3 years before the age of 21) players in the EPL from 8 to 12 per squad (The FA, 2015), with a short-term view of increasing the playing opportunities for the UK players and a long-term view of improving the success of the national teams. Nevertheless, it is important to note that these are currently proposals and have not been implemented.

The results of the present study are presented over a limited number of seasons. Thus, in order to gain a greater understanding of the influx of the non-UK players and their effects on the EPL, a more historic comparison would be required. Nevertheless, this would be challenging, as this would predate the introduction of semi-automated tracking systems. In addition, some of the physical and technical developments may be driven by altered tactics or playing styles, for example, playing formation can influence some physical and technical performance metrics during a match (Bradley et al., 2011). Due to the nature of the data set and the fluidity of these factors, it was not factored into the analysis. Moreover, due to the nature of the desensitised data, it was impossible to discriminate between the non-UK players who had played in the EPL for consecutive seasons and those in their first season (repeated measures design needed); with this information, it could be assessed whether the non-UK players bring greater performance to the EPL or whether the non-UK players adapt after playing a number of seasons in the EPL. It must also be noted that player nationality was classified by the players eligibility for a national side, however, this does not acknowledge the fact that a player can be eligible for a national side but can play their entire domestic career in a different country, nor does this acknowledge a player's true place of birth, as players can play for a national side dependent upon their relatives registered birth country.

In conclusion, small differences were observed in the physical and technical performance of a large sample of the UK and non-UK players in 2006–2007, namely the UK players covering greater high-intensity distances but with lower numbers of passes being made when compared with the non-UK players. However, by the 2012–2013 seasons, these small differences are no longer present. It can be speculated that the non-UK players have increased their physical performance to match their UK counterparts over the seasons in question, either through individual adaptation or altered player recruitment policies. The UK players' relative improvements in technical performance may also have been due to similar factors, but these changes may also be partly explained due to altered playing styles or tactics adopted by EPL teams over this period.

Practical Implications

The physical and technical demands are not different between UK and Non-UK players across a longitudinal period and thus from a recruitment perspective, this may advise clubs that Non-UK players can adapt to the Modern English Premier League.The 30-40% increases in the physical and technical metrics across the seven seasons for UK and Non-UK players means that optimising their physical capacity and technical proficiency is imperative to ensure players can cope with the high demands of the Modern English Premier League.

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